

What Is Claimed Is:

1. A system for providing a plurality of multimedia telecommunication services to a plurality of multimedia workstations, the system comprising:  
5 a multimedia central office which includes a digital switch complex coupled to a public digital telephone network, the multimedia central office including at least one twisted pair transceiver coupled to at least one twisted pair link in a telephone loop plant, the multimedia central office further including at least one switch complex operatively associated with the digital switch complex and the at least one twisted pair transceiver, wherein the multimedia central office transceives a first plurality of signals with a first at least one of the multimedia workstations interfaced to the public digital telephone network, wherein the multimedia central office transceives a second plurality of signals with a second at least one of the multimedia workstations interfaced to the at least one twisted pair link in the telephone loop plant, and wherein the first plurality and the second plurality of signals each include audio signals, video signals, and digital data signals.

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2. The system of claim 1 wherein the multimedia telecommunication services include application sharing between at least two of the multimedia workstations.

3. The system of claim 1 wherein the multimedia telecommunication services include window sharing between at least two of the multimedia workstations.

4. The system of claim 1 wherein the multimedia telecommunication services include multimedia messaging between at least two of the multimedia workstations.

5 5. The system of claim 1 wherein the digital switch complex is coupled to a third-party network, wherein the multimedia telecommunication services provided by the system include providing a gateway to the third-party network.

10 6. The system of claim 1 wherein the multimedia central office is networked to a second multimedia central office via at least one common carrier digital transmission link coupled to the digital switch complex.

15 7. The system of claim 6 wherein each of at least two of the multimedia workstations is coupled to the multimedia central office by a corresponding one of at least two dedicated digital carriers, and wherein the multimedia central office concentrates data received on the at least two dedicated digital carriers for transmission to the second multimedia central office.

20 8. The system of claim 1 further comprising an internal premise communication system which couples at least two of the multimedia workstations to the multimedia central office, wherein the at least two of the multimedia workstations share access to the multimedia central office via the internal premise communication system.

9. The system of claim 1 wherein the first at least one and the second at least one of the multimedia workstations are located within a common user premise.

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10. The system of claim 1 wherein the multimedia workstations are located at a plurality of user premises.

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11. The system of claim 1 wherein the multimedia central office transceives audio signals having an effective bandwidth of at least 5 kHz, color video signals having an effective bandwidth of at least 3 MHz, and digital data signals having a bit rate of at least 128 kbps via the at least one twisted pair link.

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12. The system of claim 1 wherein an analog

video signal is communicated between the multimedia central office and one of the second at least one of the multimedia workstations using a plurality of space division video signals, each of the space division video signals transmitted over a corresponding one of a plurality of twisted pair links.

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13. The system of claim 12 wherein the at least one twisted pair transceiver includes:

a plurality of filters responsive to the analog video signal, each of the filters passing a corresponding band of frequencies contained within the analog video signal and producing a corresponding filtered signal based thereupon;

at least one frequency shifter, each of the at least one frequency shifter producing a corresponding

frequency-shifted signal based upon the filtered signal from a corresponding one of the filters; and  
5 a plurality of transmitters which transmits each frequency-shifted signal over a corresponding one of the plurality of twisted pair links.

14. The system of claim 12 wherein the at least one twisted pair transceiver includes:

10 a plurality of receivers which receives the space division video signals;

15 at least one frequency shifter responsive to the receivers, each of the at least one frequency shifter producing a corresponding reconstructed signal; and

20 15 a mixer responsive to each corresponding reconstructed signal to form a reconstructed analog video signal.

15 20 25 15. The system of claim 12 wherein the analog video signal contains a chrominance signal and a luminance signal, wherein the chrominance signal is transmitted over a first of the twisted pair links and the luminance signal is transmitted over a second of the twisted pair links.

16. The system of claim 12 wherein the at least one twisted pair transceiver includes:

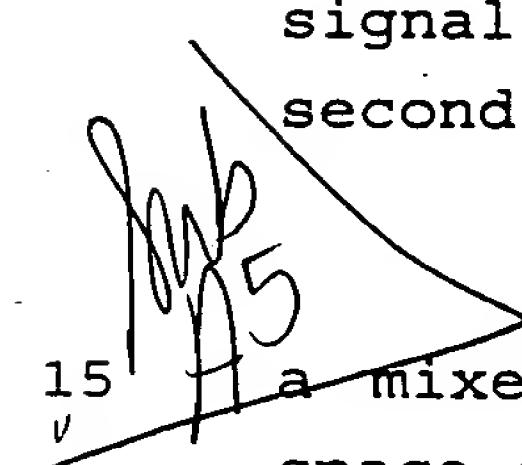
25 a band-pass filter which produces a band-pass signal in dependence upon the analog video signal, the analog video signal containing a chroma carrier signal and sidebands associated therewith, the band-pass filter passing the chroma carrier signal and the sidebands 30 associated therewith;

a frequency down-shifter, in communication with the band-pass filter, which produces a frequency shifted signal based upon the band-pass signal;

5 a low-pass filter which produces a low-pass signal in dependence upon the analog video signal, the low-pass filter having a cut-off frequency less than the frequency of the chroma carrier signal;

10 a first transmitter which transmits a first signal over a first of the twisted pair links, the first signal based upon the frequency shifted signal; and

15 a second transmitter which transmits a second signal over a second of the twisted pair links, the second signal based upon the low-pass signal.



17. The system of claim 12 further comprising

space-division video signals to form a mixed signal, wherein the mixed signal is transmitted over the one of the twisted pair links corresponding to the one of the space division video signals.

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18. The system of claim 17 further comprising a modulator which modulates the audio signal for application to the mixer.

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19. The system of claim 1 wherein a digital signal is communicated between the multimedia central office and one of the multimedia workstations over a plurality of twisted pair links using digital inverse multiplexing, wherein a corresponding bit stream carried over each of the twisted pair links has a bit rate higher than that for an ISDN basic rate interface.

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20. The system of claim 19 further comprising:

5 a first digital inverse multiplexer which produces a plurality of digital streams each having a bit rate lower than that of the digital signal; and

10 a second digital inverse multiplexer in communication with the first digital inverse multiplexer via the plurality of twisted pair links, the second digital inverse multiplexer producing a reconstructed digital signal from the plurality of digital streams.

21. The system of claim 20 further comprising:

15 a first codec which forms the digital signal in dependence upon an analog signal; and

20 a second codec coupled to the second digital inverse multiplexer, which forms a reconstructed analog signal from the reconstructed digital signal.

22. A method of providing a plurality of multimedia telecommunication services to a plurality of multimedia workstations, the method comprising the steps of:

25 providing a multimedia central office capable of providing the multimedia telecommunication services;

20 coupling a first at least one of the multimedia workstations to the multimedia central office by the public digital telephone network;

30 coupling a second at least one of the multimedia workstations to the multimedia central office by at least one twisted pair link within a telephone loop plant;

transceiving a first plurality of signals between the multimedia central office and the first at

least one of the multimedia workstations via the public digital telephone network; and

5 transceiving a second plurality of signals between the multimedia central office and the second at least one of the multimedia workstations via the telephone loop plant;

wherein the first plurality and the second plurality of signals include audio signals, video signals, and digital data signals.

10 23. The method of claim 22 wherein the multimedia telecommunication services include application sharing between at least two of the multimedia workstations.

15 24. The method of claim 22 wherein the multimedia telecommunication services include window sharing between at least two of the multimedia workstations.

20 25. The method of claim 22 wherein the multimedia telecommunication services include multimedia messaging between at least two of the multimedia workstations.

26. The method of claim 22 further comprising the steps of:

25 coupling the multimedia central office to a third-party network; and

providing, to at least one of the multimedia workstations, a gateway to the third-party network.

27. The method of claim 22 further comprising the steps of:

providing a second multimedia central office;  
and

5 networking the multimedia central office to  
the second multimedia central office via at least one  
common carrier digital transmission link.

28. The method of claim 27 wherein each of at  
least two of the multimedia workstations is coupled to  
the multimedia central office by a corresponding one of  
10 at least two dedicated digital carriers, the method  
further comprising the step of concentrating data  
received on the at least two dedicated digital carriers  
for transmission to the second multimedia central  
office.

15 29. The method of claim 22 further comprising  
the step of:

20 coupling at least two of the multimedia  
workstations to the multimedia central office by an  
internal premise communication system, wherein the at  
least two of the multimedia workstations share access to  
the multimedia central office via the internal premise  
communication system.

25 30. The method of claim 22 wherein the first  
at least one and the second at least one of the  
multimedia workstations are located within a common user  
premise.

31. The method of claim 22 wherein the  
multimedia workstations are located at a plurality of  
user premises.

32. The method of claim 22 wherein the multimedia central office transceives audio signals having an effective bandwidth of at least 5 kHz, color video signals having an effective bandwidth of at least 5 MHz, and digital data signals having a bit rate of at least 128 kbps via the at least one twisted pair.

33. The method of claim 22 wherein the step of transceiving includes a step of communicating an analog video signal between the multimedia central office and one of the second at least one of the multimedia workstations using a plurality of space division video signals, each of the space division video signals transmitted over a corresponding one of a plurality of twisted pair links.

34. The method of claim 33 wherein the step of communicating includes the steps of:

producing a plurality of filtered signals based upon the analog video signal, each of the filtered signals passing a corresponding band of frequencies contained within the analog video signal;

frequency shifting each of at least one of the filtered signals to produce at least one frequency shifted signal; and

transmitting each of the at least one frequency-shifted signal over a corresponding one of the plurality of twisted pair links.

35. The method of claim 33 wherein the step of communicating includes the steps of:

receiving each of at least one space division video signal;

frequency shifting the at least one space division video signal to produce at least one reconstructed signal; and

5 mixing the at least one reconstructed signal to form a reconstructed analog video signal.

36. The method of claim 33 wherein the analog video signal contains a chrominance signal and a luminance signal, and wherein the step of communicating includes the steps of:

10 transmitting the chrominance signal over a first of the twisted pair links; and

transmitting the luminance signal over a second of the twisted pair links.

37. The method of claim 33 wherein the analog video signal contains a chroma carrier signal and sidebands associated therewith, and wherein the step of communicating includes the steps of:

20 band-pass filtering the analog video signal to produce a band-pass signal containing the chroma carrier signal and the sidebands associated therewith;

frequency down-shifting the band-pass signal to produce a frequency shifted signal;

25 low-pass filtering the analog video signal to produce a low-pass signal containing frequencies less than the frequency of the chroma carrier signal;

transmitting a first signal over a first of the twisted pair links based upon the frequency shifted signal; and

30 transmitting a second signal over a second of the twisted pair links based upon the low-pass signal.

38. The method of claim 33 wherein the analog video signal contains a chroma carrier signal and sidebands associated therewith, and wherein the step of communicating includes the steps of:

5 receiving a first signal via a first of the twisted pair links;

receiving a second signal via a second of the twisted pair links;

10 frequency up-shifting the first signal to produce a third signal; and

mixing the third signal and the second signal to form a reconstructed video signal.

39. The method of claim 33 further comprising a step of mixing an audio signal with one of the space 15 division video signals to form a mixed signal, wherein the mixed signal is transmitted over the one of the twisted pair links corresponding to the one of the space division video signals.

40. The method of claim 22 wherein the step 20 of transceiving the second plurality of signals includes the step of communicating a digital signal over a plurality of twisted pair links using digital inverse multiplexing, wherein a corresponding bit stream carried over each of the twisted pair links has a bit rate 25 higher than that for an ISDN basic rate interface.

41. The method of claim 40 wherein the step of communicating includes the steps of:

30 inverse multiplexing the digital signal to produce a plurality of digital streams each having a bit rate lower than that of the digital signal;

transmitting each of the digital streams via  
a corresponding one of the twisted pair links;  
receiving the digital streams; and  
inverse multiplexing the digital streams to  
5 produce a reconstructed digital signal.

42. The method of claim 41 further comprising  
the steps of:  
forming the digital signal in dependence upon  
an analog signal; and  
10 forming a reconstructed analog signal from the  
reconstructed digital signal.

43. A method of communicating an analog video  
signal and an audio signal over a plurality of twisted  
pair links, the method comprising the steps of:  
15 forming a first space division video signal  
and a second space division video signal based upon the  
analog video signal;  
mixing the audio signal with the second space  
division video signal to form a mixed signal; and  
20 transmitting the first space division video  
signal over a first of the twisted pair links;  
transmitting the mixed signal over a second of  
the twisted pair links.

44. A system for communicating an analog  
25 video signal and an audio signal over a plurality of  
twisted pair links, the system comprising:  
means for forming a first space division video  
signal and a second space division video signal based  
upon the analog video signal;

a mixer which mixes the audio signal with the second space division video signal to form a mixed signal;

5 a first transmitter which transmits the first space division video signal over a first of the twisted pair links; and

a second transmitter which transmits the mixed signal over a second of the twisted pair links.

